

REMARKS

Claims 97-120 are pending in the application with claims 97 and 117 amended herein. Applicant expresses appreciation for the allowance of claims 97-109 and 117-120.

The amendments to claims 97 and 117 merely correct typographical errors. The amendment to claim 97 is supported at least by page 7, line 2 of the present specification and the amendment to claim 117 is supported at least by page 5, line 23 of the present specification. Such amendments now more positively express limitations that were previously inherent in such claims and, accordingly, are not for the purpose of narrowing and do not effectively narrow the scope of any claim.

Claims 110-116 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Aoki. Claim 112 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Aoki in view of Kingon. Applicant requests reconsideration.

Claim 110 sets forth an integrated circuit that includes, among other features, a hemispherical grain platinum layer over a substrate and an intervening layer between the hemispherical grain platinum layer and the substrate. The hemispherical grain platinum layer has a continuous surface and is characterized by columnar pedestals with an average diameter of at least about 200 Angstroms. Pages 2-5 of the Office Action allege that Aoki discloses every limitation of claim 10 except for the average diameter of the columnar pedestals. Applicant submits herewith a Declaration of Prior

Invention establishing completion by actual reduction to practice of the inventions set forth in claims 110-116 prior to the effective date of Aoki.

Fig. 4 of the present application is identical to Figure 1 of the Invention Disclosure attached to the Declaration. Fig. 4 (Figure 1) shows a hemispherical grain platinum layer having a continuous surface and characterized by columnar pedestals with an average diameter of at least about 200 Angstroms, as established by the Declaration and as described at least at page 11, line 19 to page 13, line 10 of the present specification. Pursuant to 37 C.F.R. 1.131, Aoki does not claim the same patentable inventions as set forth in claims 110-116 and the rejection of such claims is not based upon a statutory bar. Accordingly, claim 110 is patentable over Aoki.

Claims 111-115 depend from claim 10 and are patentable at least for such reason as well as for the reduction to practice of the inventions set forth in such claims prior to the effective date of Aoki. Further, claim 112 is patentable over Aoki in view of Kingon.

Claim 116 sets forth a capacitor that includes, among other features, a first capacitor electrode over a monocrystalline silicon substrate, a second capacitor electrode, and a dielectric layer between the first and second capacitor electrodes. At least one of the first and second capacitor electrodes includes hemispherical grain platinum having a continuous surface characterized by columnar pedestals having heights greater than or equal to about one-third of a total thickness of the platinum and having an average

diameter of at least about 200 Angstroms. As will be appreciated from the discussion above regarding the reduction to practice of the invention of claim 110 established by the Declaration included herewith, the Declaration also establishes reduction to practice of the invention set forth in claim 116. The text of the present specification incorporated by reference into the Declaration, in particular, supports such reduction to practice. At least for such reason, claim 116 is patentable over Aoki.

In keeping with the assertions above, Applicant asserts that claims 110-116 are patentable over Aoki and Kingon considered alone or in combination and requests allowance of claims 110-116 in the next Office Action.

Claims 110-116 stand rejected under 35 U.S.C. as being unpatentable over Nakamura. Applicant requests reconsideration.

The subject matter of claim 110 is discussed above. Pages 5-7 of the Office Action allege that Nakamura discloses every limitation of claim 110 except for the columnar pedestal average diameter of at least about 200 Angstroms. Page 5 of the Office Action alleges that it would have been obvious to form the platinum layer with the desired average diameter since "discovering an optimum value of a result effective variable involves only routine skill in the art." However, Applicant asserts that the Office Action does not establish a *prima facie* case of obviousness. First, Nakamura does not suggest to those of ordinary skill that they should make an integrated circuit with the claimed hemispherical grain platinum layer having columnar pedestals with an average diameter of at least about 200 Angstroms. Second, Nakamura

does not reveal that in so making, those of ordinary skill would have a reasonable expectation of success.

Pages 1-2 of the present specification discuss the problem of platinum-comprising materials having a relatively smooth upper surface and the advantage of incorporating roughened platinum-comprising layers into integrated circuitry. Nakamura does not include any disclosure or suggestion of the problem of platinum-comprising materials having a relatively smooth upper surface or of the advantage of such materials having a roughened upper surface.

Applicant notes that the Federal Circuit has determined that the problem confronted by the inventor must be considered in determining whether it would have been obvious to modify references in order to solve that problem. Diversitech Corp. v. Century Steps Inc., 7 USPQ2d 1315, 1318 (Fed. Cir. 1988). If the references do not address or even recognize the problem they cannot begin to teach or suggest a solution to it. None of the references cited in the Office Action address the problem solved by Applicant's invention and, accordingly, cannot suggest a solution to such problem. The Federal Circuit further stated that "the nature of the problem 'which persisted in the art,' and the inventor's solution, are factors to be considered in determining whether the invention would have been obvious to a person of skill in that art." Northern Telecom v. Datapoint Corp., 15 USPQ2d 1321, 1324 (Fed. Cir. 1990). In Northern Telecom, the Federal

Circuit confirmed a finding that the claims were valid in view of prior art that did not "suggest the [inventors'] solution" to a problem. Id. at 1323-24.

Nakamura cannot be considered to suggest to those of ordinary skill that they should make the claimed integrated circuit since Nakamura does not provide any discussion of enhancing a surface area of a platinum-comprising material. The Office Action admits that Nakamura does not teach the claimed average diameter of at least about 200 Angstroms. Applicant asserts that Nakamura further does not provide any suggestion or motivation to provide a layer with columnar pedestals having such a feature. Nakamura does not in any way recognize some advantage that may exist in providing the claimed columnar pedestals in a platinum layer. As far as Nakamura is concerned, the average diameter of at least about 200 Angstroms does not provide any advantage. At least for such reasons, Nakamura does not suggest to those of ordinary skill that they should make an integrated circuit with the claimed hemispherical grain platinum layer having columnar pedestals with an average diameter of at least about 200 Angstroms. Thus, the Office Action fails to establish the first requirement of a *prima facie* case of obviousness.

Page 6, lines 5-21, page 8, line 19 to page 9, line 9, page 11, lines 9-14, page 13, lines 18-21 and elsewhere throughout the present specification establish that it is possible to control a grain structure and/or roughened surface of platinum-containing material by controlling various process parameters. For example, the present specification identifies deposition temperature, oxidizer flow rate, carrier gas flow rate, and other conditions as influencing the surface structure of a deposited platinum-containing material. Further, the specification describes process parameters that will not produce the hemispherical grain platinum layer set forth in claim 110.

By comparison, Nakamura does not provide any discussion of the process parameters used to form platinum layer 112 alleged by the Office Action as disclosing the hemispherical grain platinum layer set forth in claim 110. Nakamura does not recognize that certain process parameters will produce the claim 110 platinum layer and other process parameters will not. It is impossible to tell from Nakamura whether or not platinum layer 112 has columnar pedestals with an average diameter of at least about 200 Angstroms. The Office Action alleges that it would be obvious to discover such an optimum value for average diameter. However, Nakamura does not contain any disclosure or suggestion of the technical information needed to produce such a characteristic in platinum-containing material. Only the Applicant's own specification provides the needed technical information.

For example, page 9, lines 5-9 of the present specification describes a preferred temperature range. Page 13, lines 8-10 describe a temperature range wherein the hemispherical grain platinum layer of claim 110 will not be formed. Page 7, line 13 to page 8, line 3 discusses a preferred oxidizer flow rate. Page 11, lines 9-14 discuss an oxidizer flow rate wherein the platinum layer of claim 110 will not result. In addition, Fig. 4 described on page 11, line 21 to page 12, line 15 shows a hemispherical grain platinum layer that results from a certain set of process parameters. In comparison, Fig. 5 and page 13, lines 11-21 show a platinum layer that does not contain hemispherical grain platinum as a direct result of the selected process parameters.

Nakamura does not disclose or suggest any of the relationships and significance of process parameters for producing a hemispherical grain platinum layer with columnar pedestals having an average diameter of at least about 200 Angstroms. At least for such reason, Applicant asserts that Nakamura does not reveal a reasonable expectation of success in making the integrated circuit of claim 110. Applicant above establishes that Nakamura also does not suggest making the claimed device. However, even if some basis can be found in the art for making the claimed device, Applicant has demonstrated herein that no reasonable expectation of success exists in attempting to make the integrated circuit of claim 110. At least for such reasons, claim 110 is patentable over Nakamura.



Claims 111-115 depend from claim 110 and are patentable at least for such reason as well as for the additional limitations of such claims not disclosed or suggested.

The subject matter of claim 116 is described above. As may be appreciated from the discussion above regarding the deficiencies of Nakamura as applied to claim 110, claim 116 is also patentable over Nakamura.

In keeping with the assertions herein, claims 110-116 are patentable over Nakamura and Applicant requests allowance of such claims in the next Office Action.

Applicant herein establishes adequate reasons supporting allowance of all pending claims and requests allowance of claims 97-120 in the next Office Action.

Applicant previously filed a Supplemental Information Disclosure Statement on July 9, 2003. Applicant has not yet received a copy of the Form PTO-1449 that accompanied the IDS with the Examiner's initials indicating consideration of the cited references. Applicant requests return of the initialed document with the next Office Action.

Respectfully submitted,

Dated: 20 Jan 2004 By: 
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